

blown out. Of these, No. 13 is the home Mr. of C. B. Harris (see fig. 3), who made his way out of the storm's path and into his house just in time to escape. No. 4 is an elevator. This tall building standing so near the path of the storm and remaining undamaged shows that destructive velocities did not extend appreciably farther from the center at an altitude of 50 to 75 feet than at the ground.

Some freaks of the wind were reported. A farmer who had just left the store, started across the street when he saw the storm coming. Finding nothing else to hold to he clutched the wheel of a wagon near the curb. The wind struck and for a brief flash the man wrestled with the wagon. Then it broke from him and went flying

struck by a tornado which laid waste most of the business section. Three people are thought to have been killed and many injured. The place is said to be a pile of wreckage. A 48-mile wind was reported from Oklahoma City.

At Atchison, Kans., a cloudburst in which 3 inches of water fell within an hour, filled the streets, flooded basements and caused damage estimated at \$100,000.

A heavy windstorm which swept through Clinton, Mo., unroofed many houses in the residence section and blew railroad cars from the track. Telephone and telegraph wires are down.

Sweeping through northern Jackson and western Atchison counties in Kansas, a tornado wrecked a score of farmhouses, and injured a number of people. Buildings on two blocks in the town of Muscotah were destroyed. A heavy rain followed the wind here.

All rainfall records for the month of March were broken at Topeka when a precipitation of 3.88 inches was recorded. Small streams entering the Kaw are expected to go out of their banks before morning. Reports received from western Kansas indicate that a heavy rainfall was general throughout the Kaw Valley. Hail was reported in a few places.

The weather map of the evening of March 15 (about 6:15 p. m. local time) is reproduced as figure 4. At this time, two hours after the occurrence of the tornado, there was a northwest wind of 36 miles an hour and a temperature of 48° F. at Wichita, following a maximum velocity of 88 miles an hour, while at Oklahoma City there was a strong south wind of 36 miles an hour and a temperature of 70° F. It seems probable that some of the cold wind which was blowing at the surface in central and western Kansas overran the strong warm wind in eastern Oklahoma, and by the highly unstable and turbulent condition thereby produced caused the whirl at Porter and the excessively strong convection which made the intense storms at many other points in this region.—C. F. Brooks.

#### THE STORM OF MARCH 16, 1919, AT FORT SMITH, ARK.

By LEON J. GUTHRIE, Meteorologist.

A destructive thunderstorm, attended by violent wind gusts of 76 or more miles an hour, occurred a few minutes after midnight of March 15.

Lightning was observed to the west and southwest of the station about 10:30 p. m. of the 15th. Thunder began at 11:38 p. m. and continued at intervals until 1:33 a. m. of the 16th. At 12:07 a. m. the wind attained an extreme of 76 miles an hour and a 5-minute maximum of 58 miles an hour; but it blew in violent gusts that probably momentarily exceeded these figures, especially at points about 1 mile north of the Weather Bureau station. The storm moved from the southwest to the northeast, the path of greatest violence roughly following the banks of the Arkansas River, through the northern part of the city, thence through Van Buren and to Alma. The path was about 1 mile wide in Fort Smith, but had narrowed to about a half mile when it passed through Van Buren. The storm showed none of the characteristics of tornadic action, and its attendant display of lightning and thunder was extremely mild.

In the northern part of Fort Smith and in Van Buren the damage to roofs, windows, chimneys, wires, truck crops, and small frail buildings totaled in the neighborhood of \$25,000.

The greatest loss was suffered by the Berry-Beall Dry Goods Co., a wholesale house, whose entire stock, valued at \$500,000, was materially damaged. The roof of the store was blown off, and the pipes connecting the building with a large water tank were broken. The contents of the tank were emptied into the building from the top floor, drenching the entire stock.

The damage to the dry goods was approximately \$200,000, making a total loss of \$225,000 caused by the storm. Two persons are known to have suffered slight injuries, but there was no loss of life.

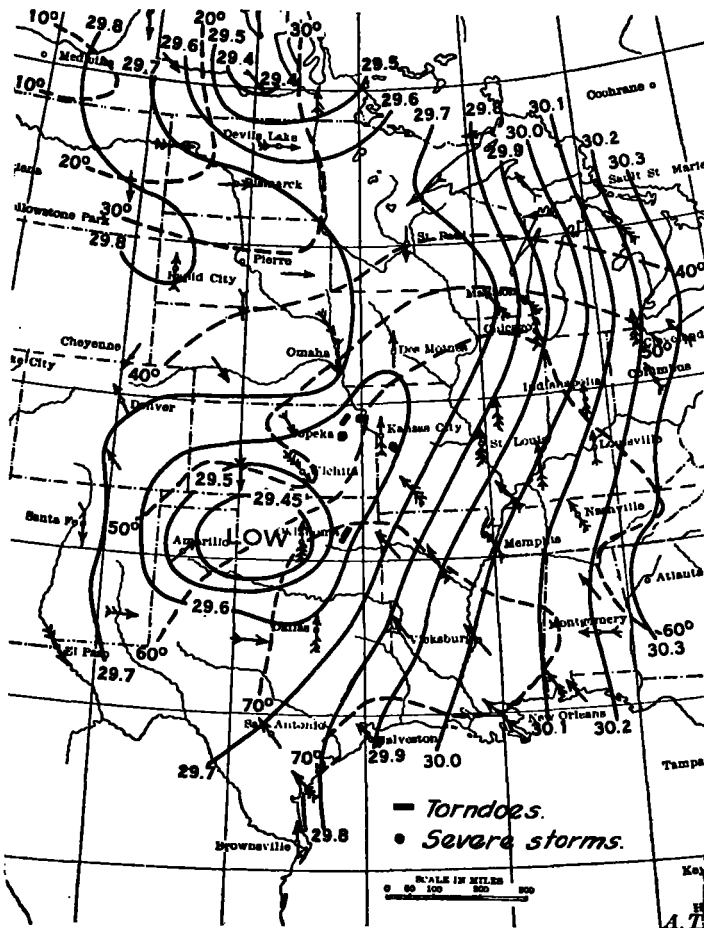


FIG. 4.—Weather map, Mar. 15, 1919, 7 p. m., 80th meridian time. Number of bars on wind arrows indicates velocities in Beaufort scale.

away in the air. The farmer was not injured. Near the railroad station four teams of horses were tied. The tornado dipped over the first team and lifted the second and fourth. The first and third teams were unharmed.

Leaving Porter the storm continued in a northeasterly direction, depositing debris picked up in Porter along its path for several miles. Two schoolhouses and some farm buildings were destroyed in the next 4 or 5 miles.

#### DISCUSSION.

The tornado described was one of many severe storms accompanying a cyclone central over the Great Plains on March 15. Some of these are briefly described in the accompanying account taken from the Tulsa (Okla.) Daily World, March 16, 1919:

KANSAS CITY, Mo., March 15.

Three persons are reported as killed, scores injured, and a vast amount of property damaged by tornadoes and cloudbursts, which struck towns in Kansas, Missouri, and Oklahoma late this afternoon.

The town of Porter, Okla., 12 miles northwest of Muskogee, was